

1. The recommended daily allowance of sodium is 2400 mg. A nutritionist claims that one serving of ready-to-eat or add-water soup contains more than 800 mg of sodium, on average. For her sample of 31 ready-to-eat or add-water soups, the average amount of sodium in one serving was 845.7 mg with a standard deviation of 168.3 mg. Determine if there sufficient evidence to conclude that one serving of ready-to-eat or add-water soup contains **(a)** more than 800 mg of sodium, on average. **(b)** other than 800 mg of sodium, on average.
2. In 2004, 72% of Americans said that sex education should be taught in middle school. In a June 2009 Fox News poll of 900 registered voters, 75% responded that sex education should be taught in middle school. Determine if there is sufficient evidence to conclude that the percentage of Americans who say that sex education should be taught in middle school has **(a)** increased. **(b)** changed?
3. A marketing researcher wants to estimate the average annual amount spent by Amazon Prime members while shopping on Amazon.com. For a random sample of 100 Amazon Prime members who recently made a purchase on Amazon.com, the average annual amount spent on purchases on Amazon.com was \$1,500 with a standard deviation of \$200. Determine if there is sufficient evidence to conclude that the average annual amount spent on Amazon.com by Amazon Prime members is other than from \$1,475 at a 0.05 level of significance.
4. The Washington Metropolitan Area Transit Authority has set a bus fleet reliability goal of 8,000 bus miles. Bus reliability is measured specifically as the number of bus miles traveled before a mechanical breakdown that requires the bus to be removed from service or deviate from the schedule. For a random sample of 64 buses in the fleet, the average bus reliability was 8,210 bus miles with a standard deviation of 625 bus miles. Determine if there is sufficient evidence to conclude that the average bus reliability for the fleet is greater than 8,000 miles **(a)** at a 0.1 level of significance. **(b)** at a 0.05 level of significance. **(c)** at a 0.25 level of significance.
5. According to CarMD\*, "The five most common problems that trigger the 'check engine' light are a faulty oxygen sensor, catalytic converter, ignition coil & spark plug(s), loose fuel cap and mass air flow sensor." and that car repair costs increased by 2.7% in 2016. The average cost to replace catalytic converter with new OE (original equipment) catalytic converter was \$1,190.18 in 2016. For a random sample of 100 recent catalytic converter replacements, the average repair cost was \$1,125 with the standard deviation of \$250. Determine if there is sufficient evidence to conclude that the average cost to replace a catalytic converter is less than \$1,190.18 **(a)** at a 0.1 level of significance. **(b)** at a 0.05 level of significance.
6. Patient wait-time is a common problem in the doctor's waiting room. One acceptable standard of practice states that the average wait-time for patients to be seen by the first provider in hospital outpatient and public health clinics should be less than 30 minutes. In a study conducted to assess patient wait-time at a primary healthcare clinic<sup>‡</sup>, the average patient wait-time for a random sample of 860 patients was 24.05 minutes with a standard deviation of 16.5 minutes. Determine if there is sufficient evidence to conclude that the average patient wait-time is less than 30 minutes **(a)** at a 0.05 level of significance. **(b)** at a 0.25 level of significance. **(c)** at a 0.01 level of significance.
7. You are the manager of a restaurant that delivers pizza to college dormitory rooms. You change your delivery process in an effort to reduce the average order processing time, the amount of time between when an order is placed to the completion of delivery, from its current 25 minutes. Based on a random sample of thirty-six orders using the new delivery process, the average order processing time is 22.4 minutes with a standard deviation of 6 minutes. Determine if there is sufficient evidence to conclude that the average order processing time is less than 25 minutes due to the implementation of this new delivery process **(a)** at a 0.1 level of significance. **(b)** at a 0.05 level of significance.
8. According to a National Association of Colleges and Employers (NACE) survey, 44% of college students who had unpaid internships received full-time job offers after graduation compared to 72% of college students who had paid internships.\* A recent survey of sixty unpaid college interns at a local university found that thirty students received full-time job offers after graduation. Determine if there is sufficient evidence at a 0.05 level of significance to conclude that the percentage of unpaid college interns who received full-time job offers after graduation **(a)** has increased. **(b)** has changed.

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\* <http://www.carmd.com/wp/vehicle-health-index-introduction/2017-carmd-vehicle-health-index/>

‡ Based on data extracted from BA Ahmad, K. Khairatul, and A. Farnazza, "An assessment of patient waiting and consultation time in a primary healthcare clinic," Malaysian Family Practice, 2017, 12(1), pp. 14–21.

\* <https://www.debt.org/students/internship/>